

1. An interlocking assembly of a voice coil motor for a hard disk drive, said assembly comprising:

an arcuate shaped hollow structure formed by metal injection molding, said hollow structure including a bottom plate member separated from a top plate member by a pair of upright members disposed therebetween, said upright members joining with inside surfaces of said plate members are disposed at each end of said hollow structure, a tapered recess formed into the inside surface of said bottom plate, said recess ingressing from a convex edge of said bottom plate and narrowing while extending through to an opposite concave edge, said tapered recess having side edges shaped to tightly interlock with a dovetail shaped member, and a flat arcuate shaped permanent magnet having dovetail side edges to slidely interlock with said tapered recess of said bottom plate of said hollow structure.

2. The interlocking assembly according to Claim 1 wherein said metal injection molding of a hollow structure has integrated four structural elements of a standard voice coil motor and eliminated inventory management for separate parts.

3. The interlocking assembly according to Claim 1 wherein said metal injection molding of a hollow structure has eliminated the need for fasteners and adhesives.

4. The interlocking assembly according to Claim 1 wherein said metal injection molding of a hollow structure has provided a tapered recess with

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self locking attributes for removably securing the permanent magnet without fasteners or adhesives.

- 30        5. The interlocking assembly according to Claim 1 wherein said metal injection molding of a hollow structure provides a reduction of a gap between the magnet and plate thereby permitting a more intense magnetic flux between the gap.
- 35        6. The interlocking assembly according to Claim 1 wherein said metal injection molding of a hollow structure has provided a structurally superior voice coil motor.
- 40        7. An interlocking assembly of a voice coil motor for a hard disk drive, said assembly comprising:
- an arcuate shaped base member with a top surface and a bottom surface, said base member having a pair of upright columns molded to said top surface, said upright columns disposed at each end of said base member, a molded tapered recess formed on said top surface between said upright columns, said recess ingressing from a convex edge of said base and narrowing while extending opposite towards a concave edge, said tapered recess having side edges shaped to tightly receive and interlocking with;
- 45        a flat arcuate shaped permanent magnet having dovetail side edges to slidely interlock with said tapered recess of said base member;
- 50        an arcuate shaped cover plate

8. The interlocking assembly according to Claim 7 wherein said arcuate shaped base with pair of said upright columns is formed by metal injection  
55 molding has integrated three of four structural elements of a standard voice coil motor and reduced inventory management.

9. The interlocking assembly according to Claim 7 wherein said metal  
60 injection molding of said arcuate base member provides a reduction of a gap between the magnet and plate thereby permitting a more intense magnetic flux between the gap.

10. An interlocking assembly of a voice coil motor for a hard disk drive,  
65 said assembly comprising:

an arcuate shaped base member with a top surface and a bottom surface, a molded tapered and truncated recess formed centrally on said top surface, said recess ingressing from a convex edge of said base and narrowing while extending opposite towards a concave edge, forming a truncated recess, said recess having side edges shaped to tightly receive and to interlock with;  
70 a flat arcuate shaped permanent magnet having dovetail side edges to slidely interlock with said tapered recess of said base member; an arcuate shaped cover plate having a pair of molded down-reaching columns, said columns disposed under and at each end of said base member;

75 11. The interlocking assembly according to Claim 10 wherein said arcuate shaped cover plate with said pair of said upright columns is formed by metal

80 injection molding thus integrating three of four structural elements of a standard voice coil motor thereby reducing inventory management.

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85 12. The interlocking assembly according to Claim 10 wherein said metal injection molding has provided a tapered recess with self locking attributes for removably securing the permanent magnet without the use of fasteners or adhesives.

90 13. The interlocking assembly according to Claim 10 wherein said metal injection molding of said arcuate base member provides a reduction of a gap between the magnet and plate thereby permitting a more intense magnetic flux between the gap.

95 14. An interlocking assembly of a voice coil motor for a hard disk drive, said assembly comprising:

100 95 an arcuate shaped base member with a top surface and a bottom surface, said base member having a upright column molded to said top surface, said upright column disposed at one end of said base member, a molded tapered and truncated recess formed centrally on said top surface, said recess ingressing from a convex edge of said base and narrowing while extending opposite towards a concave edge, forming a truncated recess, said recess having side edges shaped to tightly receive and to interlock with;

105 100 a first flat arcuate shaped permanent magnet having dovetail side edges to slidely interlock with said tapered recess of said base member;

105 105 an arcuate shaped cover plate with a top surface and a bottom surface, said cover plate having a down-reaching column molded to said bottom

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surface, said column disposed under and opposite end of said column disposed on base member; said cover plate including a molded tapered and truncated recess formed centrally on surface, said recess ingressing from a convex edge of said cover plate and narrowing while extending opposite towards a concave edge, forming a truncated recess, said recess having side edges shaped to tightly receive and to interlock with; a second flat arcuate shaped permanent magnet having dovetail side edges to slidely interlock with said tapered recess of said base member;

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15. The interlocking assembly according to Claim 14 wherein said arcuate shaped cover plate and said arcuate shaped base member, each with a supporting column, are formed by metal injection molding thus integrating four structural elements of a standard voice coil motor thereby reducing inventory management.

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16. The interlocking assembly according to Claim 14 wherein said metal injection molding has provided a tapered recess with self locking attributes for removably securing the permanent magnet without the use of fasteners or adhesives.

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17. A method for interlocking an assembly of a voice coil motor for a hard disk drive, comprising the steps of:

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providing an arcuate shaped hollow structure formed by metal injection molding, said hollow structure including a bottom plate member separated from a top plate member by a pair of upright members disposed therebetween, said upright members joining with inside surfaces of said plate members are disposed at each end of said hollow structure, a tapered recess formed into the inside surface of said bottom

plate, said recess ingressing from a convex edge of said bottom plate and  
135 narrowing while extending through to an opposite concave edge, said  
tapered recess having side edges shaped to tightly interlock with a  
dovetail shaped member, and

providing a flat arcuate shaped permanent magnet having dovetail side  
edges to slidely interlock with said tapered recess of said bottom plate of  
140 said hollow structure.

18. The interlocking method according to Claim 17 wherein said metal  
injection molding of a hollow structure has integrated four structural elements of  
a standard voice coil motor and eliminated inventory management for separate  
145 parts.

19. The interlocking method according to Claim 17 wherein said metal  
injection molding of a hollow structure has eliminated the need for fasteners and  
adhesives.

20. The interlocking method according to Claim 17 wherein eliminating  
assembly with adhesives eliminates the failure problems associated with defective  
adhesion between parts, long term effects of outgassing, and controlling the  
adhesive within the outside boundaries of the parts.

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21. The interlocking method according to Claim 17 wherein said metal  
injection molding of a hollow structure has provided a tapered recess with  
self locking attributes for removably securing the permanent magnet without  
fasteners or adhesives.

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22. The interlocking method according to Claim 17 wherein said metal injection molding of a hollow structure provides a reduction of a gap between the magnet and plate thereby permitting a more intense magnetic flux between the gap